

WHAT IS CLAIMED IS:

1. A Ni-based superalloy having high oxidation resistance, the superalloy being hardened by dispersing  $\gamma'$  phases in a  $\gamma$ -phase matrix, wherein the superalloy contains, by weight, C: 0.01 to 0.5%, B: 0.01 to 0.04%, Hf: 0.1 to 2.5%, Co: 0.8 to 15%, Ta: less than 8.5%, Cr: 1.5 to 16%, Mo: less than 1.0%, W: 5 to 14%, Ti: 0.1 to 4.75%, Al: 2.5 to 7%, Nb: less than 4%, V: 0 to less than 1.0%, Zr: 0 to less than 0.1%, Re: 0 to less than 9%, at least one of platinum group elements: 0 to less than 0.5% in total, and at least one of rare earth elements: 0 to less than 0.1% in total.

2. A Ni-based superalloy according to Claim 1, wherein the superalloy contains, by weight, C: 0.05 to 0.2%, B: 0.01 to 0.03%, Hf: 1.1 to 2.5%, Co: 9.7 to 15%, Ta: 0.1 to 4.5%, Cr: 1.5 to 9%, Mo: 0.01 to 0.9%, W: 5 to 14%, Ti: 0.1 to 4.75%, Al: 4 to 7%, Nb: 0.1 to less than 4%, Re: 0.01 to less than 9%, at least one of rare earth elements: 0 to less than 0.1% in total, and any of V, Zr and platinum group elements: not more than 0.005%.

3. A Ni-based superalloy according to Claim 2, wherein Ti is in the range of 0.1 to 0.45 percent by weight.

4. A Ni-based superalloy according to Claim 1, wherein the superalloy contains, by weight, C: 0.05 to 0.2%, B: 0.01

to 0.03%, Hf: 1.1 to 2.5%, Co: 0.8 to 4.75%, Ta: 0.1 to 4.5%, Cr: 1.5 to 9%, Mo: 0.01 to 0.9%, W: 5 to 14%, Ti: 0.1 to 4.75%, Al: 4 to 7%, Nb: 0.1 to less than 4%, Re: 0.01 to less than 9%, at least one of rare earth elements: 0 to less than 0.1% in total, and any of V, Zr and platinum group elements: not more than 0.005%.

5. A Ni-based superalloy according to Claim 4, wherein Ti is in the range of 0.1 to 0.45 percent by weight.

6. A Ni-based superalloy according to Claim 1, wherein the superalloy contains, by weight, C: 0.01 to 0.5%, B: 0.01 to 0.03%, Hf: 1.1 to 2.5%, Co: 9.7 to 15%, Ta: less than 8.5%, Cr: 1.5 to 16%, Mo: less than 1.0%, W: 5 to 14%, Ti: 0.1 to 4.75%, Al: 4 to 7%, Nb: less than 4%, Re: 0.01 to less than 9%, at least one of platinum group elements: 0 to less than 0.5% in total, at least one of rare earth elements: 0 to less than 0.1% in total, and any of V and Zr: not more than 0.005%, and wherein a value obtained from a formula of  $(0.004 \times \text{W content (weight\%)} + 0.004 \times 2 \times \text{Mo content (weight\%)} + 0.004 \times \text{Re content (weight\%)}) / (0.003 \times 3 \times \text{Ti content (weight\%)} + 0.006 \times \text{Ta content (weight\%)} + 0.006 \times 2 \times \text{Nb content (weight\%)})$  is in the range of 1.0 to 2.5.

7. A Ni-based superalloy according to Claim 6, wherein the value obtained from the formula of  $(0.004 \times \text{W content (weight\%)} + 0.004 \times 2 \times \text{Mo content (weight\%)} + 0.004 \times \text{Re$

content (weight%)) / (0.003 × 3 × Ti content (weight%) + 0.006 × Ta content (weight%) + 0.006 × 2 × Nb content (weight%)) is in the range of 1.5 to 2.0.

8. A Ni-based superalloy according to Claim 1, wherein the superalloy contains, by weight, C: 0.05 to 0.2%, B: 0.01 to 0.03%, Hf: 0.1 to 2.5%, Co: 0.8 to 15%, Ta: 0.1 to 4.5%, Cr: 9 to 16%, Mo: 0.01 to 0.3%, W: 5 to 14%, Ti: 0.1 to 4.75%, Al: 2.5 to 7%, Nb: 0.1 to less than 4%, Re: 0 to less than 9%, at least one of rare earth elements: 0 to less than 0.1% in total, and any of V, Zr and platinum group elements: not more than 0.005%.

9. A Ni-based superalloy according to Claim 8, wherein Hf is in the range of 1.1 to 2.5 percent by weight and Al is in the range of 2.5 to 4.5 percent by weight.

10. A Ni-based superalloy according to Claim 1, wherein the superalloy contains, by weight, C: 0.05 to 0.2%, B: 0.01 to 0.03%, Hf: 0.1 to 2.5%, Co: 0.8 to 15%, Ta: less than 0.5%, Cr: 9 to 16%, Mo: 0.01 to 0.3%, W: 5 to 14%, Ti: 2 to 4.75%, Al: 2.5 to 4%, Nb: 0.75 to less than 4%, at least one of rare earth elements: 0 to less than 0.1% in total, and any of V, Zr and platinum group elements: not more than 0.005%.

11. A Ni-based superalloy according to Claim 10, wherein Cr is more than 13%, but not more than 16 percent by

weight and Nb is in the range of 2 to less than 4 percent by weight.

12. A Ni-based superalloy according to Claim 8, wherein Ti is in the range of 2 to 4.75 percent by weight, a value obtained from a formula of  $(3.8 \times \text{Ti content (weight\%)} + 2 \times \text{Nb content (weight\%)} + \text{Ta content (weight\%)}) / (2 \times \text{Mo content (weight\%)} + \text{W content (weight\%)} + \text{Re content (weight\%)})$  is in the range of 1.6 to 2.8, and a value obtained from a formula of  $(3.8 \times \text{Ti content (weight\%)} + 3.5 \times \text{Cr content (weight\%)}) / (6.8 \times \text{Al content (weight\%)})$  is in the range of 1.8 to 3.1.

13. A casting of a Ni-based superalloy in which  $\gamma'$  phases are dispersed in a  $\gamma$ -phase matrix, the Ni-based superalloy containing, by weight, C: 0.01 to 0.5%, B: 0.01 to 0.04%, Hf: 0.1 to 2.5%, Co: 0.8 to 15%, Ta: less than 8.5%, Cr: 1.5 to 16%, Mo: less than 1.0%, W: 5 to 14%, Ti: 0.1 to 4.75%, Al: 2.5 to 7%, Nb: less than 4%, V: 0 to less than 1.0%, Zr: 0 to less than 0.1%, Re: 0 to less than 9%, at least one of platinum group elements: 0 to less than 0.5% in total, and at least one of rare earth elements: 0 to less than 0.1% in total.

14. A Ni-based superalloy casting having high oxidation resistance, wherein the superalloy according to Claim 13 is cast by a unidirectional solidifying process.

15. A gas turbine part formed of a casting of a Ni-based superalloy in which  $\gamma'$  phases are dispersed in a  $\gamma$ -phase matrix, the Ni-based superalloy containing, by weight, C: 0.01 to 0.5%, B: 0.01 to 0.04%, Hf: 0.1 to 2.5%, Co: 0.8 to 15%, Ta: less than 8.5%, Cr: 1.5 to 16%, Mo: less than 1.0%, W: 5 to 14%, Ti: 0.1 to 4.75%, Al: 2.5 to 7%, Nb: less than 4%, V: 0 to less than 1.0%, Zr: 0 to less than 0.1%, Re: 0 to less than 9%, at least one of platinum group elements: 0 to less than 0.5% in total, and at least one of rare earth elements: 0 to less than 0.1% in total.

16. A gas turbine part according to Claim 15, wherein the casting is cast by a unidirectional solidifying process.